

CLAIMS

WHAT IS CLAIMED:

- 1 1. A multi-spectral detector for use in a passive /active system, comprising:
 - 2 an optically dispersive element capable of separating received LADAR and radiation
 - 3 received from a scene into a plurality of spectral components and distributing
 - 4 the separated spectral components; and
 - 5 a detector array including:
 - 6 a plurality of detectors capable of detecting the LADAR radiation; and
 - 7 a plurality of detectors capable of detecting the spectral components of the
 - 8 scene radiation; and
 - 9 an integrated circuit capable of generating a plurality of electrical signals
 - 10 representative of predetermined characteristics of the detected LADAR
 - 11 radiation and the detected spectral components.
- 1 2. The detector of claim 1, wherein the optically dispersive element comprises a
- 2 diffraction grating or a linear variable filter.
- 1 3. The detector of claim 2, wherein the optically dispersive element is integrated with
- 2 the detector array.
- 1 4. The detector of claim 1, wherein the optically dispersive element is integrated with
- 2 the detector array.
- 1 5. The detector of claim 1, wherein the detectors capable of detecting the LADAR
- 2 radiation or the detectors capable of detecting the spectral components of the scene radiation
- 3 comprise QWIPs or EQWIPs.
- 1 6. The detector of claim 1, wherein the detectors capable of detecting the LADAR
- 2 radiation or the detectors capable of detecting the spectral components of the scene radiation
- 3 have varied widths and are separated by varied pitches.
- 1 7. The detector of claim 6, wherein the detectors capable of detecting the LADAR
- 2 radiation or the detectors capable of detecting the spectral components of the scene radiation
- 3 comprise QWIPs or EQWIPs.

1 8. The detector of claim 1, wherein the detector array is integrated with the integrated
2 circuit.

1 9. The detector of claim 8, wherein the optically dispersive element is integrated with
2 the detector array.

1 10. A multi-spectral detector for use in a passive /active system, comprising:
2 means for distributing a plurality of spectral components of received LADAR and
3 infrared radiation received from a scene;
4 means for detecting the distributed LADAR radiation;
5 means for detecting the spectral components of the infrared radiation; and
6 means for generating a plurality of electrical signals representative of predetermined
7 characteristics of the detected LADAR radiation and the detected spectral
8 components.

1 11. The detector of claim 10, wherein the distributing means diffracts the received
2 LADAR and infrared radiation.

1 12. The detector of claim 11, wherein the distributing means comprises a diffraction
2 grating.

1 13. The detector of claim 10, wherein the distributing means comprises a diffraction
2 grating.

1 14. The detector of claim 10, wherein the distributing means is integrated with the
2 detecting means.

1 15. The detector of claim 10, wherein the detecting means comprises QWIPs or EQWIPs.

1 16. The detector of claim 10, wherein detecting means comprises a plurality of detectors
2 have varied widths and are separated by varied pitches.

1 17. The detector of claim 10, wherein the detecting means is integrated with the
2 generating means.

1 18. An imaging system, comprising:
2 a laser capable of transmitting LADAR radiation;

3 a multi-spectral detector for use in a passive /active system, comprising:
4 an optically dispersive element capable of separating received LADAR and
5 radiation received from a scene into a plurality of spectral components
6 and distributing the separated spectral components; and
7 a detector array including:
8 a plurality of detectors capable of detecting the LADAR radiation; and
9 a plurality of detectors capable of detecting the spectral components of
10 the scene radiation; and
11 an integrated circuit capable of generating a plurality of electrical
12 signals representative of predetermined characteristics of the
13 detected LADAR radiation and the detected spectral
14 components; and
15 a processor for processing the electrical signals.

1 19. The imaging system of claim 18, wherein the optically dispersive element comprises a
2 diffraction grating or a linear variable filter.

1 20. The imaging system of claim 18, wherein the optically dispersive element is
2 integrated with the detector array.

1 21. The imaging system of claim 18, wherein the detectors capable of detecting the
2 LADAR radiation or the detectors capable of detecting the spectral components of the scene
3 radiation comprise QWIPs or EQWIPs.

1 22. The imaging system of claim 18, wherein the detectors capable of detecting the
2 LADAR radiation or the detectors capable of detecting the spectral components of the scene
3 radiation have varied widths and are separated by varied pitches.

1 23. The imaging system of claim 18, wherein the detector array is integrated with the
2 integrated circuit.

1 24. A method for use in identifying an object in a field of view, comprising:
2 passively detecting radiation from a scene, the detection employing a detector array;
3 and
4 actively detecting LADAR radiation through the detector array in parallel with
5 passively detecting the scene radiation.

- 1 25. The method of claim 24, wherein passively detecting scene radiation includes
- 2 passively detecting infrared radiation.
- 1 26. The method of claim 25, wherein passively detecting infrared radiation includes
- 2 passively detecting hyperspectral infrared radiation.
- 1 27. The method of claim 24, wherein passively detecting scene radiation includes
- 2 passively detecting hyperspectral scene radiation.
- 1 28. The method of claim 24, further comprising receiving the scene and LADAR
- 2 radiation through the same optical train.
- 1 29. The method of claim 28, wherein detecting the scene and LADAR radiation includes
- 2 separating the received LADAR and scene radiation into a plurality of spectral components
- 3 and distributing the separated spectral components across the detector array.
- 1 30. The method of claim 24, further comprising generating a plurality of electrical signals
- 2 representative of predetermined characteristics of the detected LADAR radiation and the
- 3 detected spectral components.
- 1 31. An apparatus for use in identifying an object in a field of view, comprising:
2 means for passively detecting scene radiation employing a detector array; and
3 means for actively detecting LADAR radiation through the detector array in parallel
4 with passively detecting the scene radiation.
- 1 32. The apparatus of claim 31, wherein the means for passively detecting scene radiation
- 2 includes means for passively detecting infrared radiation.
- 1 33. The apparatus of claim 31, wherein the means for passively detecting scene radiation
- 2 includes means for passively detecting hyperspectral scene radiation.
- 1 34. The apparatus of claim 31, further comprising means for receiving the scene and
- 2 LADAR radiation through the same optical train.
- 1 35. The apparatus of claim 31, further comprising means for generating a plurality of
- 2 electrical signals representative of predetermined characteristics of the detected LADAR
- 3 radiation and the detected spectral components.

- 1 36. A method, comprising:
 - 2 receiving LADAR and scene radiation from a field of view;
 - 3 separating the received LADAR and scene radiation into a plurality of spectral
 - 4 components;
 - 5 directing the spectral components to respective detectors;
 - 6 detecting the spectral components; and
 - 7 generating an electrical signal representative of predetermined characteristics of the
 - 8 detected spectral components.
- 1 37. The method of claim 36, wherein receiving the scene radiation includes receiving
- 2 infrared radiation.
- 1 38. The method of claim 36, wherein receiving the scene radiation includes receiving
- 2 hyperspectral scene radiation.
- 1 39. The method of claim 36, wherein receiving the scene and LADAR radiation includes
- 2 receiving the scene and LADAR radiation through the same optical train.
- 1 40. An apparatus, comprising:
 - 2 means for receiving LADAR and scene radiation from a field of view;
 - 3 means for separating the received LADAR and scene radiation into a plurality of
 - 4 spectral components;
 - 5 means for directing the spectral components to respective detectors;
 - 6 means for detecting the spectral components; and
 - 7 means for generating an electrical signal representative of predetermined
 - 8 characteristics of the detected spectral components.
- 1 41. The apparatus of claim 40, wherein the means for receiving the scene radiation
- 2 includes means for receiving infrared radiation.
- 1 42. The apparatus of claim 40, wherein the means for receiving the scene radiation
- 2 includes means for receiving hyperspectral scene radiation.
- 1 43. The apparatus of claim 40, wherein the means for receiving the scene and LADAR
- 2 radiation includes means for receiving the scene and LADAR radiation through the same
- 3 optical train.